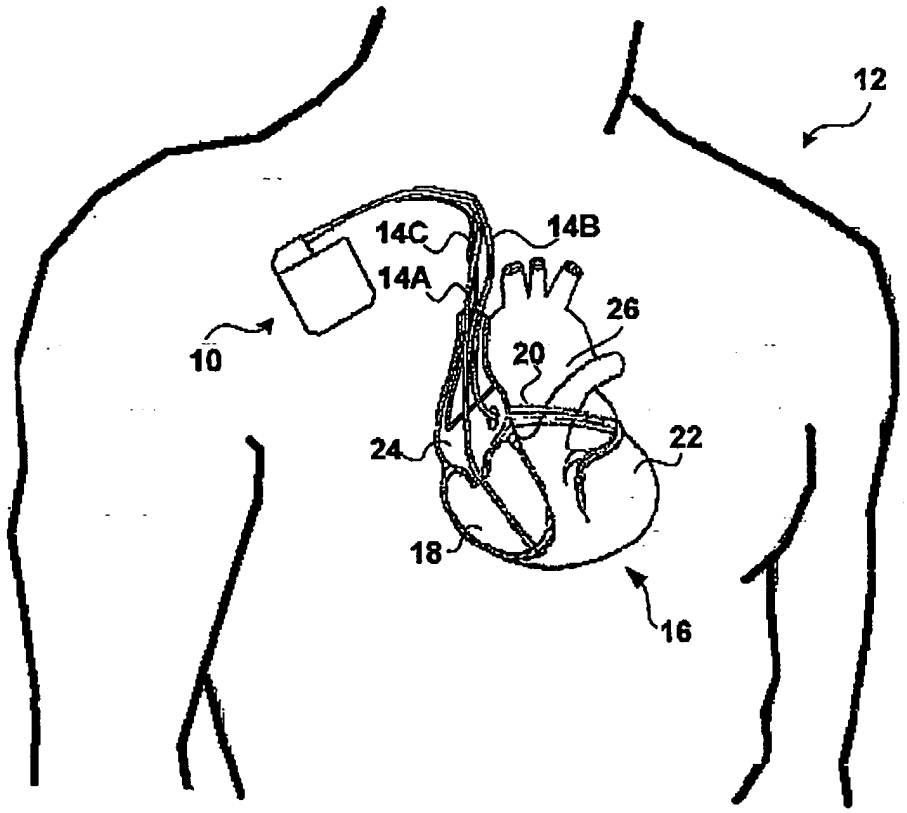

FIG. 1

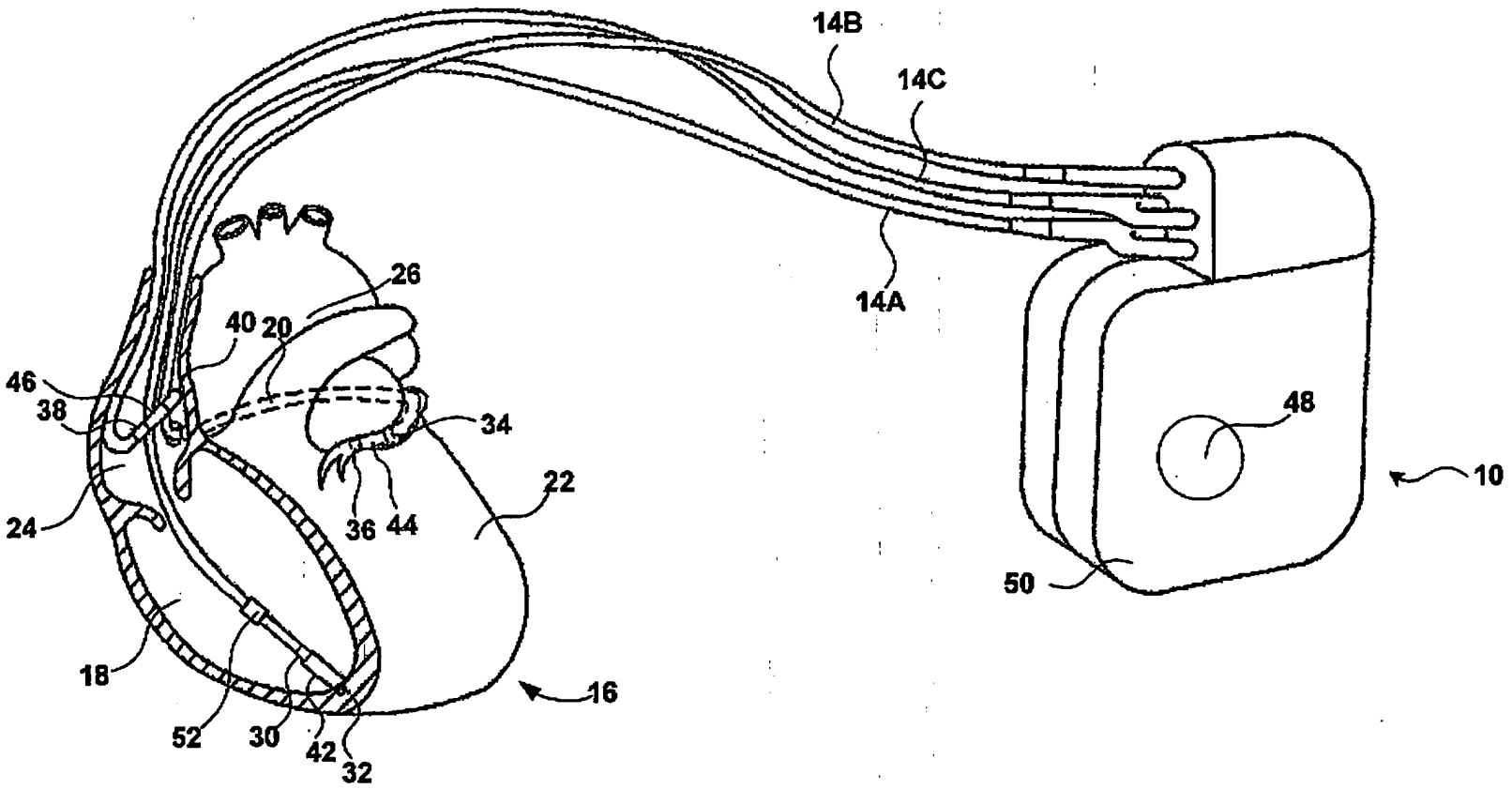

FIG. 2

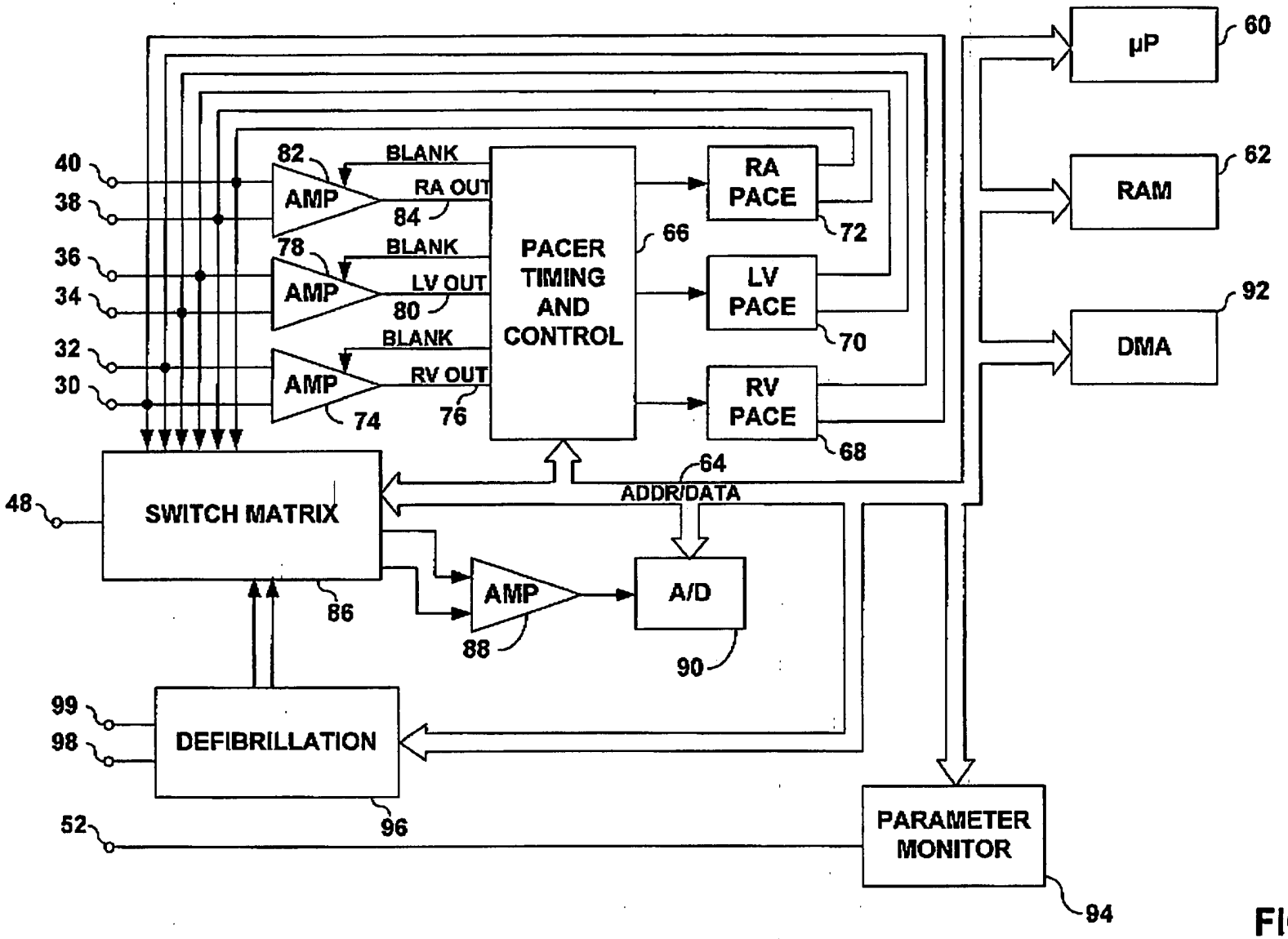
μP
60
RAM
62
DMA
92
40
38
36
34
32
30
82
BLANK
AMP
RA OUT
84
78
BLANK
AMP
LV OUT
80
BLANK
AMP
RV OUT
74
76
PACER TIMING AND CONTROL
66
RA PACE
72
LV PACE
70
RV PACE
68
64
ADDR/DATA
48
SWITCH MATRIX
86
AMP
88
A/D
90
99
98
DEFIBRILLATION
96
52
PARAMETER MONITOR
94

FIG. 3

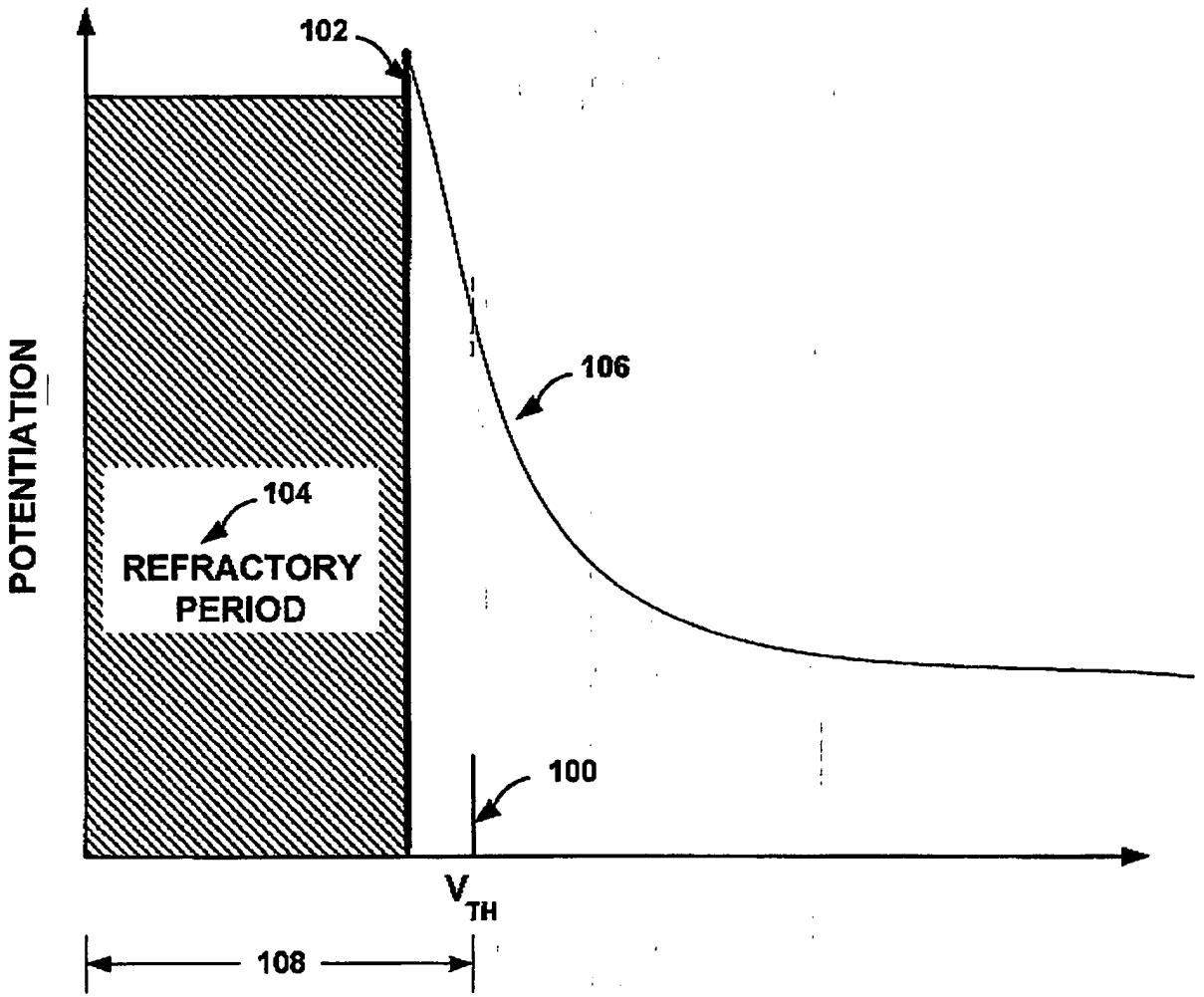
102
106
104
REFRACTORY
PERIOD
POTENTIATION
100
V_{TH}
108
TIME AFTER SYSTOLIC EVENT

FIG. 4

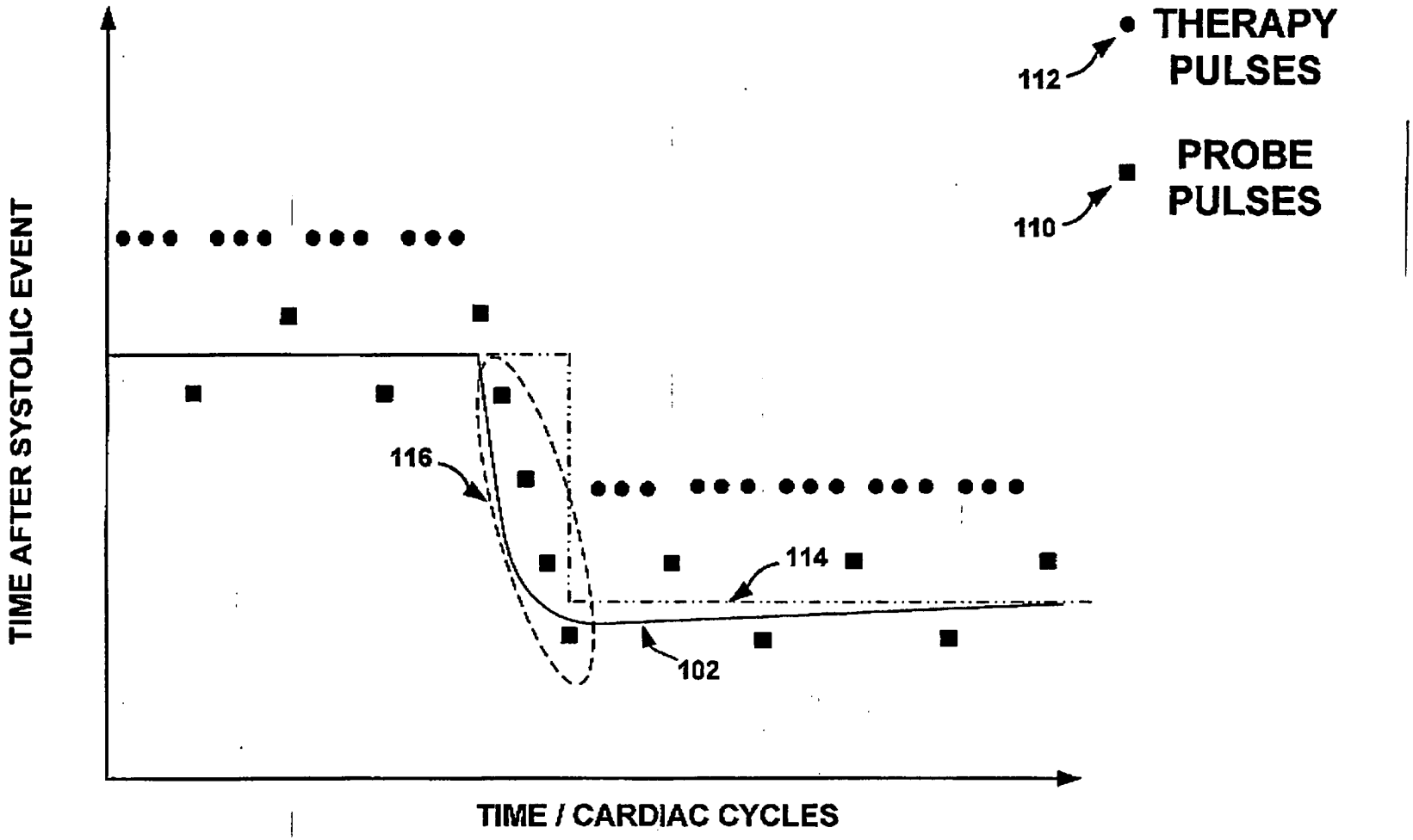
THERAPY PULSES
112
PROBE PULSES
110
TIME AFTER SYSTOLIC EVENT
116
114
102
TIME / CARDIAC CYCLES

FIG. 5

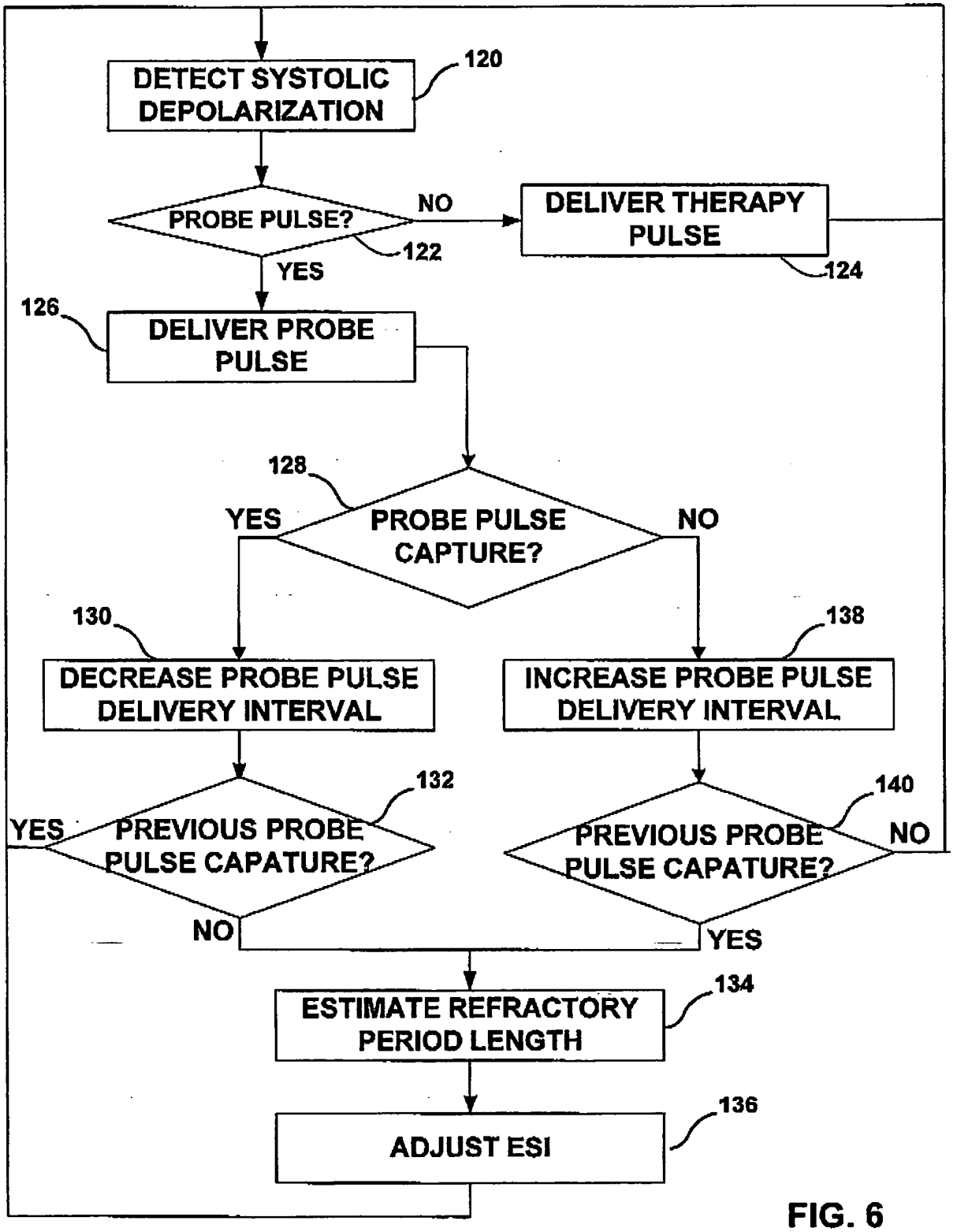
DETECT SYSTOLIC DEPOLARIZATION
120
PROBE PULSE?
NO
122
DELIVER THERAPY PULSE
124
YES
126
DELIVER PROBE PULSE
128
YES
PROBE PULSE CAPTURE?
NO
130
DECREASE PROBE PULSE DELIVERY INTERVAL
138
INCREASE PROBE PULSE DELIVERY INTERVAL
132
YES
PREVIOUS PROBE PULSE CAPATURE?
140
PREVIOUS PROBE PULSE CAPATURE?
NO
NO
YES
ESTIMATE REFRACTORY PERIOD LENGTH
134
ADJUST ESI
136

FIG. 6

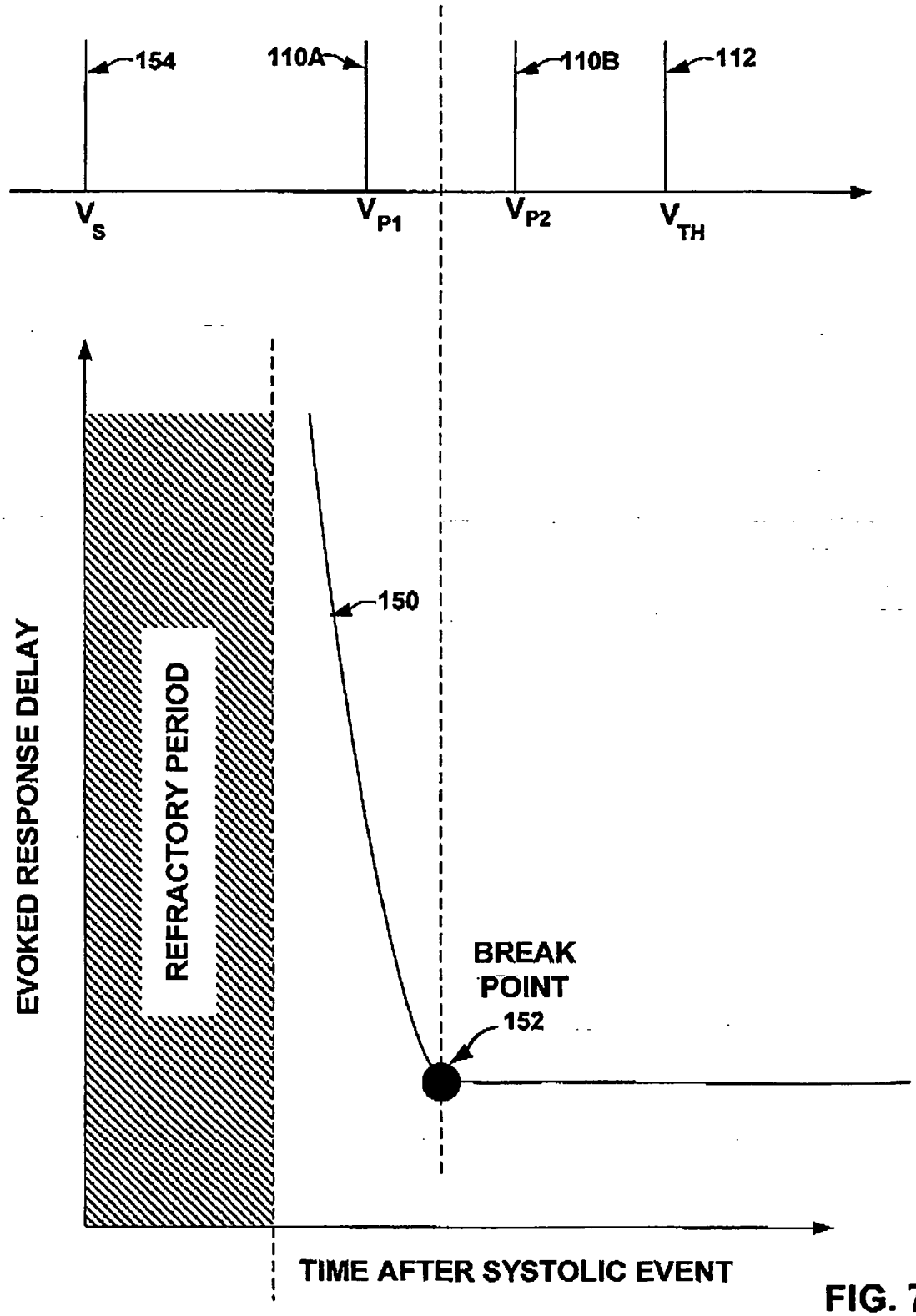
154
110A
110B
112
V_S
V_{P1}
V_{P2}
V_{TH}
EVOKED RESPONSE DELAY
REFRACTORY PERIOD
150
BREAK POINT
152
TIME AFTER SYSTOLIC EVENT

FIG. 7

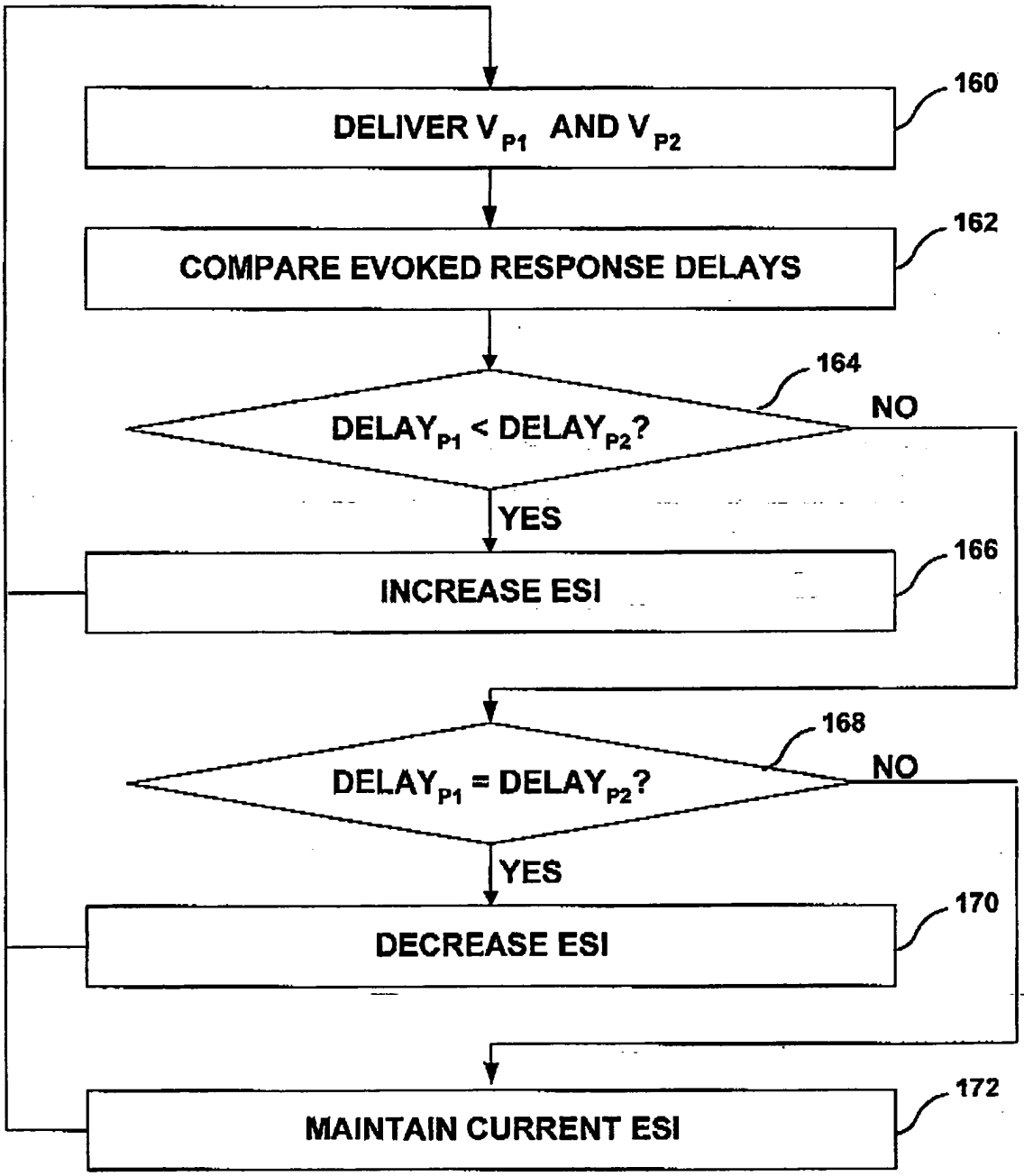
DELIVER V_{P1} AND V_{P2}
160
COMPARE EVOKED RESPONSE DELAYS
162
$DELAY_{P1} < DELAY_{P2}$?
164
NO
YES
INCREASE ESI
166
$DELAY_{P1} = DELAY_{P2}$?
168
NO
YES
DECREASE ESI
170
MAINTAIN CURRENT ESI
172

FIG. 8

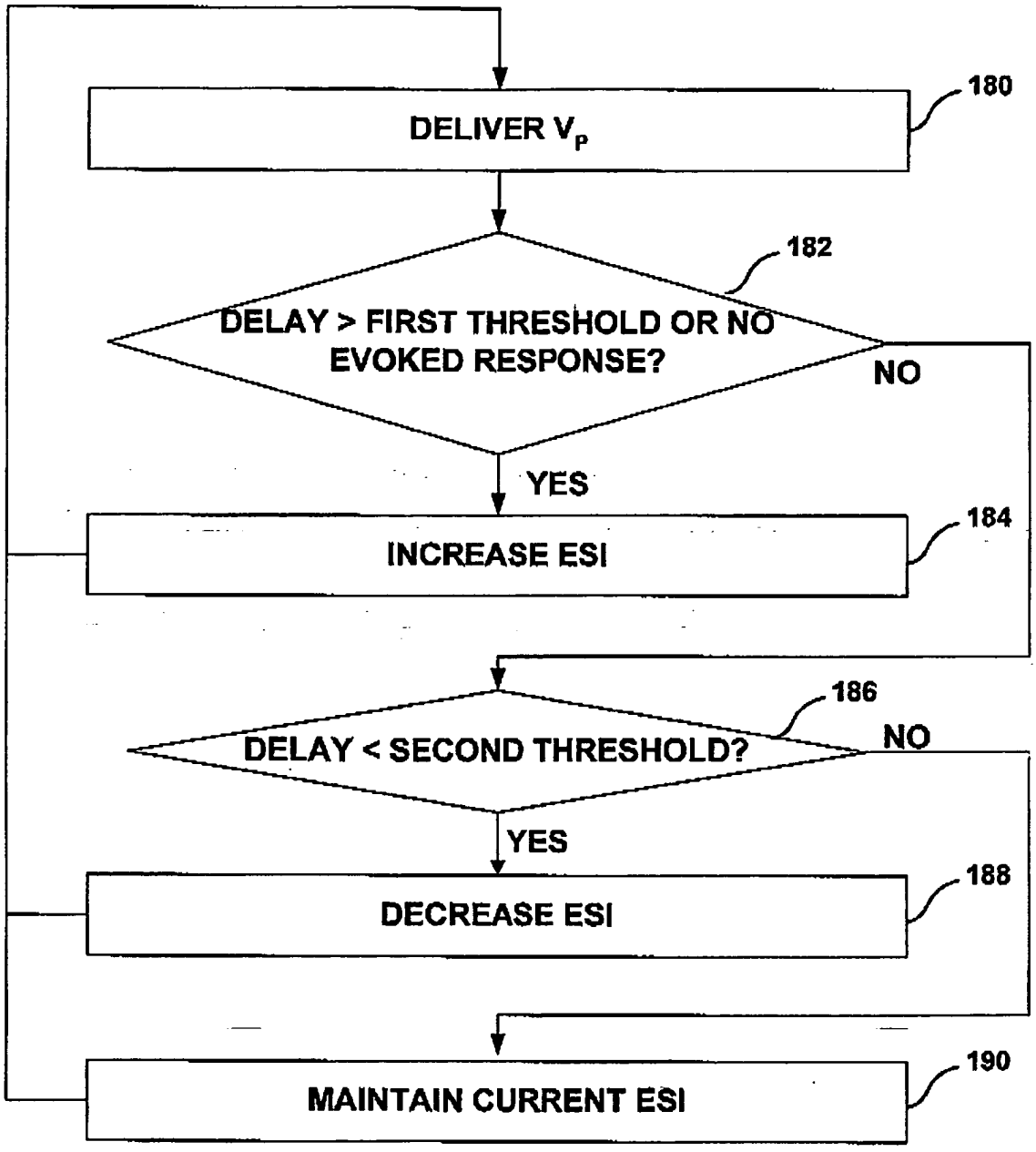
DELIVER V_P
180
182
DELAY > FIRST THRESHOLD OR NO EVOKED RESPONSE?
NO
YES
INCREASE ESI
184
186
DELAY < SECOND THRESHOLD?
NO
YES
DECREASE ESI
188
MAINTAIN CURRENT ESI
190

FIG. 9

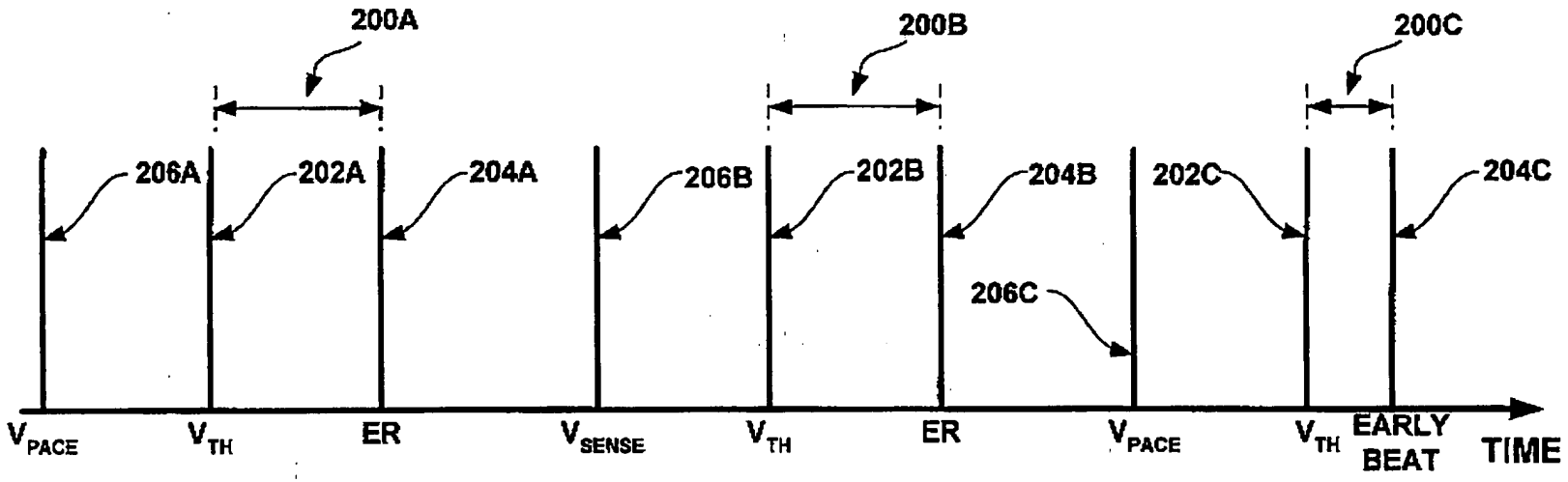
200A
200B
200C
206A
202A
204A
206B
202B
204B
202C
204C
206C
V_{PACE}
V_{TH}
ER
V_{SENSE}
V_{TH}
ER
V_{PACE}
V_{TH}
EARLY BEAT
TIME

FIG. 10

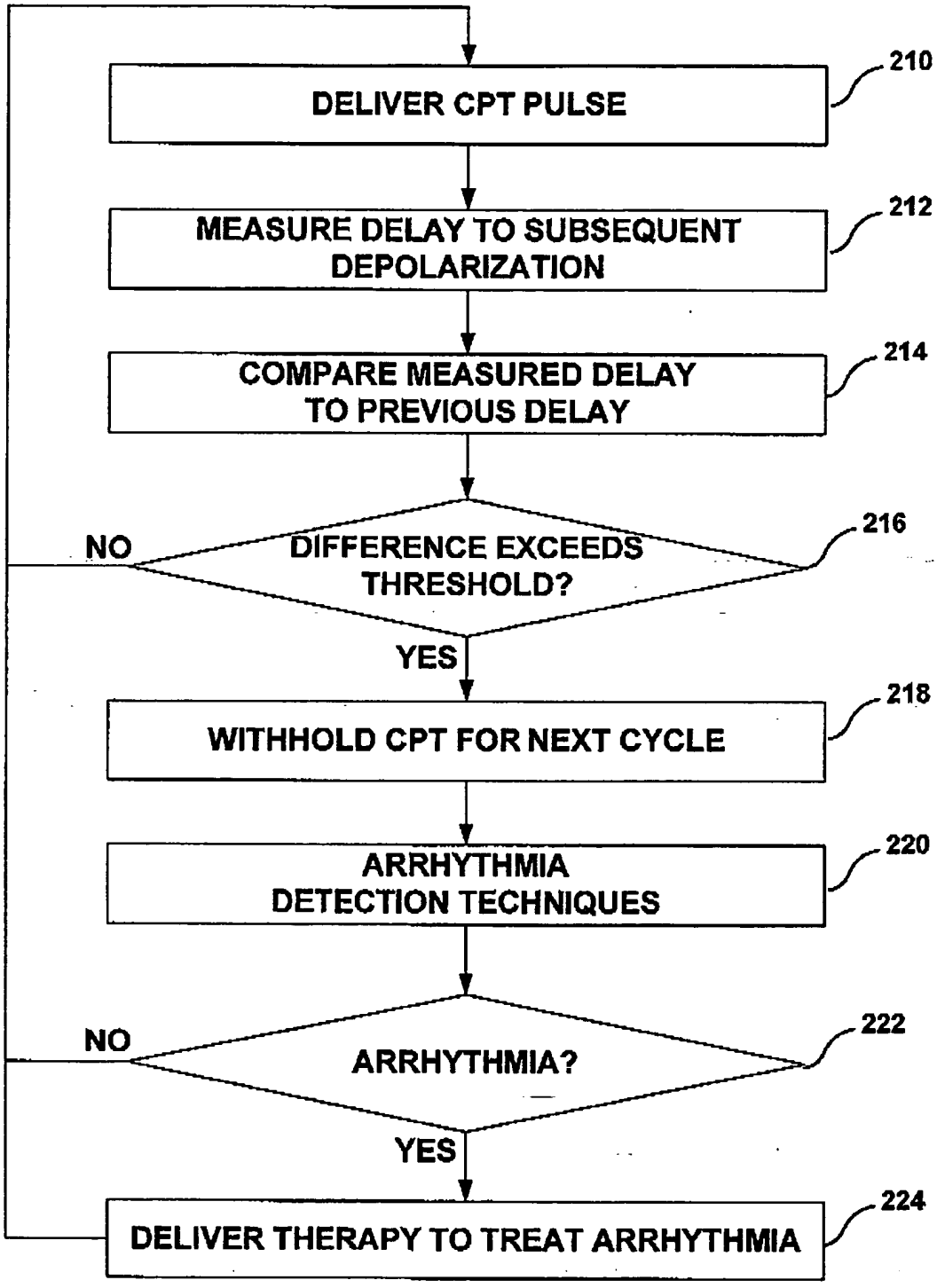
DELIVER CPT PULSE
210
MEASURE DELAY TO SUBSEQUENT DEPOLARIZATION
212
COMPARE MEASURED DELAY TO PREVIOUS DELAY
214
DIFFERENCE EXCEEDS THRESHOLD?
216
NO
YES
WITHHOLD CPT FOR NEXT CYCLE
218
ARRHYTHMIA DETECTION TECHNIQUES
220
ARRHYTHMIA?
222
NO
YES
DELIVER THERAPY TO TREAT ARRHYTHMIA
224

FIG. 11